## OAK RIDGE NATIONAL LABORATORY

OPERATED BY

## UNION CARBIDE CORPORATION

NUCLEAR DIVISION



POST OFFICE BOX X

OAK RIDGE, TENNESSEE 37830

April 9, 1975

Dr. James L. Liverman
Assistant Administrator for
Environment and Safety
U. S. Energy Research and
Development Administration
Washington, D. C. 20545

Dear Dr. Liverman:

Enclosed are copies of recent correspondence from my good friend, Dr. Eduardo Ramos. I am also sending copies of this correspondence to Martin Minthorn and Gordon Facer (DMA) as I have attempted to keep each of them up to date on what I know about Project Indalo.

I will send you some specific suggestions for your consideration later in the week.

Warmest personal regards.

Sincerely yours,

Chester R. Richmond

Associate Director for

Biomedical and Environmental

Chester R. Richmond Jemm

Sciences

CRR:1mm

Enclosures

cc: H. D. Bruner

G. C. Facer

M. L. Minthorn, Jr.



## MINISTERIO DE INDUSTRIA JUNTA DE ENERGIA NUCLEAR

## Madrid, 17 de Marzo I. 975

Dr. Chester R. Richmond
Associate Director for Biomedical and Environmental Sciences
Oak Ridge National Laboratory

### Dear Chest:

I think you have met Dr. Malboyson who carried out a letter from me to you as introduction. I hope you have talked pleasently about his bussines To day I have a very bad new. My wife have died past 27th February almost suddently – a cardiac arrest – when she were to be operated on of a umbilical hernia. We have suffered very much in those days and now very slowly are resovering.

I wish to remember to you that we are awaiting the Pu-242 to follow our analysis of the different samples, mainly those of bones and livers.

My time is arrived and next 27th I will finish my term as official amployee of this Junta. I do not know if some particular linkage will remain with me but until now I only can say goodway. Emilio will follow with the Project and he will care of the next measurements of people who will begin to came after the Holly week (23th to 30th). I will be at Cartagena with my son all the Holly Week and will be back again 3th or 4th April. Then, perhaps I will know how the things has been arranged.

With my best regards

sincerely

-Dr. Eduardo Ramos Inspector General de Protección y Seguridad.

P. S. - I wish to know your comments on the new measurements of people I sent lately.

Mark of 1919

## MINISTERIO DE ÎNDUSTRIA JUNTA DE ENERGIA NUCLEAR

Madrid, 24 de Febrero I. 975

Dr. Chester R. Richmond
Associate Director for Biomedical and Environmental Sciences
Oak Ridge National Laboratory
Union Carbide Corporation
Nuclear Division
Post Office Box X
Oak Ridge, Tennessee 37830 (USA)

## Dear Chest:

Your translations of our humble papers arrived at time. I has been engaged on meetings and several travels to the Navy Shipyards in Ferrol, Cartagena and Cádiz and it has been impossible to get time to write to you. Now I am more tranquil and I wish to send to you the copy of the seven firsts measurements made on people of Palomares. Almost all of them have been here before and were measured with the old equipment. Now you can see how all of them show measurable quantities of Pu. We colected urine to look for Pu. When I get the results I will send its to you. I think that the measurements are very intresting because after now eight years they show very clearly their lung burdens in Pu. I hope that more people will come in the next weeks. It is important to consider the results in the girl.

Now we prepared to confront the data on the winds directions and these of the measurements on filter papers at the same days and to make curves of resuspension, according with those data.

I think that it is wortwhile to follow this search seen this findings. People of Northen Scientific through that of UNITRONICS S.A. sent a technician with the good look that the analyzer was runing perfectly at that time. However he take good note of the troubles and told us that in the future ne will care of the instruments. So, be you sure that everything will go well.

How are the things in your new position?. Here we are in another "reorganization" and nobody know which is their job if any. I will remain here until next Marz. After the 27 th I will enter in the retained postion and till now I do not know if some kind of conexion will have with this Junta.

With my best regards

-Dr. Eduardo Ramos-

Inspector General de Protección y Seguridad

NOMBRE

## CONTADOR DE RADIACTIVIDAD

## CORPORAL

APELLIDOS :

ESPESOR TORACICO: 1192 cm	PROCEDENCIA PLLOMINES (Limeria) FECHA: 17 PEBRERO
377	c/s CAN. 75-100 01699 x 01163 = 01114 FONDO CORPORAL EN c/s CAN 12-24
1590	c/s CAN 75-100 C1699 x C1983 = 01687 FONDO CORPORAL EN c/s CAN 50-70
1399 C.I	c/s CAN. 12-24 01189 _ 01114 c/s FONDO CORPORAL = C1075 c/s NETAS
1.3	c/s CAN 50-70 01755 01687 c/s FONDO CORPORAL 01108 c/s NETAS
EVALUACION DE AM - 241	

•		-									
	12-24	CAN	EN	241	Am-	DΕ	FRACCION	L A	30	FVALUACION DE LA FRACCION DE AM- 241 EN CAN 12-24	
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	11										
0.1 = 0.335 ÷ 0.150	11	-	i U	41	Ct Am - 241 3	<b>₹</b>	×	. (	70	675 CAN 50-70	

nci DE Am - 241

CAN. 50-7	ALUACION
6	30
2	٦
108 ×	ALUACION DE LA FRACCION DE AM- 241 EN CAN 12-24
_m 	DE
01183	Am - 241
:	E N
=0	CAN
1020	12-24
CAN 50-70 C'108 x Et 0'183 = 0'020 = FRACCION Am - 241 EN CAN 12-24	
Am -	
241	
e Z	
CAN	
12 - 24	

c/s CAN 12-24 01055 x C+ Pu-239 500 271500 151552 n Ci DE Pu-239	500	x C <sub>f</sub> Pu-7	4 01055	c/5 CAN, 12-2
c/s CAN. 12-24 01075 - FRACCION AM-241 01020 = 01055 c/s NETAS DE Pu-239	N Am - 241 .	FRACCIO	. 01075	c/s CAN, 12-2/
	Am- 241	EXISTIENDO	EVALUACION DE Pu- 239 EXISTIENDO Am- 241	EVALUACION

c/s CAN 12-24 x C, Pu- 239		C <sub>f</sub> Pu- 239	×		24	AN. 12 - 2	c/s C
	Am - 241	EVALUACION DE Pu- 239 NO EXISTIENDO AM- 241	S	Pu- 239	ЭG	UACION	EVAL

Ci Pu- 239

NOMBRE

## CONTADOR DE RADIACTIVIDAD CORPORAL

c/s CAN 50-70 C/321 - C'040 c/s FONDO CORPORAL = C'CC7 c/s NETAS	
c/s CAN 12-24 01199 01139 c/s FONDO CORPORAL = 01060 c/s NEIAS	1710
c/s c/s CAN 75-100 01255 x 01983 =	1654
c/s CAN 75-100C1855 xC1163 =C1139 FONDO CORPORAL EN c/s CAN 12-24	CAN 12 -24 398 CT 01799

				Am- 241	EXISTIENDO	EVALUACION DE Pu- 239 EXISTIENDO Am- 241
					r-4	And the state of t
EN CAN. 12-24	4m - 24	= FRACCION Am = 241	01015	Et 0,118	×	c/s CAN 50-70 01CE7
			CAN 12-24	n - 241 EN	CION DE A	EVALUACION DE LA FRACCION DE AM- 241 EN CAN 12-24
			1			

c/s CAN 50-70 01087 x C1 Am- 241 312

01278 : 01147 nc DE Am - 241

c/s CAN 12-24 01045 x Ct Pu-239 545 = 241525 + 101845 h Ci DE Pu-239	39 545	'x C <sub>f</sub> Pu-2	01045	c/s CAN, 12-2
c/s CAN 12-24 01060 - FRACCION AM-241 01015 = 01045 c/s NETAS DE PU-239	1 Am - 241	FRACCION	0.060	c/s CAN. 12-24
	Am- 241	EXISTIENDO	DE Pu- 239	EVALUACION DE Pu- 239 EXISTIENDO Am- 241

EVALUACION DE

Pu- 239

ö

EXISTIENDO Am - 241

41975 nci Pu- 238	111250 :	c/s CAN 12-24 C1045 x C+ Pu- 238 250 =
01045 c/s NETAS DE Pu- 238	01045 c/s	c/s CAN. 12-24 01060 - FRACCION Am - 241 01015 =
		EVALUACION DE Pu- 238
n Ci Pu- 239	n Ci	c/s CAN 12-24 x C, Pu- 239

C1683 01688		C <b>T</b>
c/s CAN 12-24 0'173 _ 0'114 c/s FONDO CORPORAL = .0'059 . c/s NETAS		1400 01700
-100 01700 x 01983 = 01688 FONDO CORPORAL EN c/s CAN. 50-70	01683 c/s CAN 75-100	
-100 01700 x 01163 = 01114 FONDO CORPORAL EN c/s CAN. 12-24		346 · 0t
PROCEDENCIA PILONARES (ALMERIA)	C m.	SPESOR FORACICO 1139 Cm.
APELLIDOS: NOMBRE:		

			L-J	12-24	CAN	m	1- 241	Am	D D	FRACCIO	LA	3.0	VALUACION DE LA FRACCION DE AM- 241 EN CAN. 12-24
Am - 241	Si DE	C, Am- 241 nCi DE Am- 241		11			241 .	E E	<del>ر ا</del>	0 ×	1	70	75 CAN 50-70

VALUACION DE AM - 241

S CAN	
00-70	,
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• '	'
11	
4N 50 - 70 x E <sub>f</sub> = FRACCION Am - 241 EN CAN 12 - 24	
FRACCION	
Am -	
241	
m	
CAN	
12 - 24	

IS CAN. 12-24 x C, Pu-239 n Ci DE Pu-239	39	x C <sub>f</sub> Pu-2		24	15 CAN. 12-2
15 CAN 12-24 FRACCION AM-241 c/s NETAS DE Pu-239	4 Am - 241 .	FRACCION		4	15 CAN 12-2
	Am- 241	VALUACION DE Pu- 239 EXISTIENDO Am- 241	Pu- 239	ag.	VALUACION

5 5 906 n ci	15 CAN 12-24 0:059 x C, Pu- 239 300 = 17:700	300	C <sub>f</sub> Pu- 239 .	01059	0	15 CAN 12-2
		Am - 241	VALUACION DE Pu- 239 NO EXISTIENDO AM - 241	<sub>0-</sub> 239 NO	Dξ	VALUACION

Pu- 239

## CONTADOR DE RADIACTIVIDAD

(1)	CAN 75-100 1471 CT 01736 CF		CAN 12 - 24 279 CT 01740 C/S	ESPESOR TORACICO: 1.86 cm		CORTORAL
C/S CAN 50-70 0.676 0.723 C/S FONDO CORPORAL -	c/s CAN 12-24 C1149 _ 01120 c/s FONDO CORPORAL = C1020 c/s NETAS	c/s CAN. 75-100 01736 x 01983 = 01723 FONDO CORPORAL EN C/S CAN. 50-70	c/s CAN 75-100 01735 x 01163 = 01120 FONDO CORPORAL EN C/5 CAN 12-24	PROCEDENCIA PLIDILIERS (ALIELIA) FECHA: 19 PLERENC	APELLIDOS: NOMBRE:	

C/S CAN 50-70 .. EVALUACION Ð FRACCION x C<sub>f</sub> Am - 241 ЭG Am - 241 EN CAN 12-24 .. n Ci DE Am - 241

EVALUACION DE

Am - 241

c/s CAN 50-70 \_\_\_\_\_ = FRACCION Am - 241 EN CAN 12-24

EVALUACION

DE

Pu- 239

EXISTIENDO

Am- 241

c/s CAN, 12-24 x Ct Pu-239 C/S CAN. 12-24 - FRACCION Am - 241 c/s NETAS DE Pu-239 n Ci DE Pu-239

c/s CAN 12-24 01020 x C, Pu- 239 465 EVALUACION DE Pu- 239 NO EXISTIENDO Am - 241 91300

EVALUACION DE Pu- 238

c/s CAN. 12-24 01020 c/s CAN. 12-24 x C<sub>f</sub> Pu- 238 ..... - FRACCION Am - 241 ... 215 4:300 c/s

71935 n ci Pu- 239

31696 NETAS DE Pu- 238 ... nCı Pu- 238

NOMBRE

# CONTADOR DE RADIACTIVIDAD

CORPORAL

APELLIDOS : .....

CAN 12 - 24 309 CAN, 50 - 70 CAN 75-100 1350 CT 01675 c/s ESPESOR TORACICO: ..... 1257 C.T. 01 629 ds .. c/s c/s CAN. 75-100 c/s CAN. 75-100 C/S CAN 12-24 c/S CAN. 50 - 70 01155 01675 01 675 PROCEDENCIA x 01163 x 01963 = 159.10 01110 PALOMENS (JEIGHEN) = CTITO FONDO CORPORAL EN CIS c/s FONDO CORPORAL = c/s FONDO CORPORAL = 01654 FONDO CORPORAL EN CIS CAN. 50-70 FECHA 19 FURNILO ... c/s NETAS CAN. 12-24

EVALUACION

CIS CAN 50-70 x C; Am- 241 nCi DE Am - 241

DE Þ FRACCION DE Am - 241 Z CAN 12-24

CIS CAN = FRACCION Am - 241 EN CAN. 12-24

EVALUACION Pu- 239 EXISTIENDO

c/s CAN, 12-24 x C<sub>1</sub> Pu-239 ..... - FRACCION Am - 241 c/s NETAS DE Pu-239

n Ci

DE

CIS CAN 12-24 ...

239 NO EXISTIENDO Am - 241

c/s CAN. 12-24 0'045

x C<sub>f</sub> Pu- 239 \_\_\_\_270

121150

41886 <u>ا</u> Pu- 239

EVALUACION DE Pu- 238

C/S CAN. 12-24 C/S CAN. 12-24 ... 01045 × C<sub>1</sub> Pu- 238 120 - FRACCION Am - 241

51,00

..... c/s NETAS DE Pu- 238

## CORPORAL

C.I. c/s				ESPESOR TORACICO 1'11 Cm
c/s CAN 50-70 C1374 - 01405 c/s FONDO CORPORAL = 'c/s NETAS	C/S CAN. 12-24 01119 - 01067	c/s CAN. 75-100 0:443 x 0:983	c/s CAN 75-100 01413 x 01163	PROCEDENCIA :F/J
c/s FONDO CORPORAL =	01119 _ 01067 c/s FONDO CORPORAL = 01052	11	= C1067	PROCEDENCIA FALOTARES (ALCERIA)
cls NETAS	0.052 c/s NETAS	01406 FONDO CORPORAL EN C/S CAN. 50-70	FONDO CORPORAL EN C/5 CAN 12-24	FECHA: 19 FEBRER

CVALUACION Om M Am - 241

c/s CAN 50-70 C, Am - 241 \*\* n Ci DE Am - 241

FVALUACION DE ۲ ۵ FRACCION DE Am - 241 m Z CAN 12-24

c/s CAN. 50-70 = FRACCION Am - 241 EN CAN 12-24

EVALUACION DE Pu- 239 EXISTIENDO

c/s CAN 12-24 .... - FRACCION Am - 241 n Ci DE Pu-239 c/s NETAS DE Pu-239

c/s CAN 12-24 01052 x Cf Pu- 239 220 EVALUACION DE Pu- 239 8 EXISTIENDO Am - 241 11'440

EVALUACION DE Pu- 238

C/S CAN. 12-24 CIS CAN. 12-24 0,052 x C<sub>f</sub> Pu- 238 ..... FRACCION Am - 241 100 51200

NOMBRE : ...

APELLIDOS: ....

Am- 241

c/s CAN 12-24 x C<sub>1</sub> Pu-239

3 540 n Ci Pu- 239

.....c/s NETAS DE Pu- 238 nCi Pu- 238

CORPORAL

ESPESOR TORACICO: ..

DENCIA
PLIONARDS (AUGELI

PROCE

APELLIDOS:

FECHA: 19 FBBRESO

NOMBRE

<u>:-</u>	A	Þ Z
CAN 75-100.	IAN 50 - 70	LAN 12 - 24
1332	1413	
CT	C. T.	C.T.
C.T. 01 666 c/s	C.1. 0'707 c/s	313 CT 0121 c/s
•	<b>.</b>	Ų1

ć	3	70	7
	1332	7473 CT 0'707 c/5	
	۲ ۲	C.T	
	01 666	707.0	
i	7 /5	c/5	Č
c/s	cis		c <i>l</i> 's
c/s CAN 5	CIS CAN		c/s CAN 7
ر <del>ب</del>	_		~7

<b>C</b>	×	N 50-70 01052	0	- 70	50	:/s CAN	2/5
		Am - 241		0,5	0.2	EALUACION	17.

e/s CAN 50-70 01052 x

EVALUACION DE LA FRACCION DE

Arn - 241 EN CAN 12-24

C/S CAN 12-24 ...

8:010

- FRACCION Am-241 91011

0'037

... c/s NETAS DE Pu-239

Pu- 239

C/5. CAN 12-24

c/s CAN. 12-24

nCi Pu- 238

C1037 ... c/s NETAS DE Pu- 238

n Ci Pu- 239

# CONTADOR DE RADIACTIVIDAD

CORPORAL

	24H 75-100 1032 CT 01516 de		CAN 12 - 24 320 CT 0.160 C/s	ESPESOR TORACICO: 1114 cm.	
CIS CAN 50-70 0:486 _ 0:507 CIS FONDO CORPORAL = CIS NETAS	c/s can 12-24 01160 _ 01084 c/s FONDO CORPORAL = 01076 c/s NETAS	c/s can 75-100 07516 x C1983 = 07507 FONDO CORPORAL EN c/s CAN 50-70	c/s CAN 75-100	PROCEDENCIA PALQUARES (ALLERIA) FECHA 20 FEBRUI	APELLIDOS: NOMBRE: TRO

	12-24	ONN	EZ	1 - 241	Ап	30	FRACCION	DE LA	EVALUACION DE LA FRACCION DE Am. 241 EN CAN 12-24
C <sub>1</sub> Am - 241 inci DE Am - 241	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			241 .	A m	C+	×		c/s CAN 50-70 x C
							- 241	)E Am	EVALUACION DE Am - 241

c/s CAN. 50-70 x E	
70 x E, = FRACCION Am - 241	
= FRACCION	
EN CAN 12-24	

c/s CAN. 12-24 x C <sub>1</sub> Pu-239 = = =	c/s CAN 12-24 FRACCION AM-241 =	EVALUACION DE Pu- 239 EXISTIENDO AM- 241
n Ci DE Pu-239	c/s NETAS DE Pu-239	

			_			
C/S CAN 12-24 0.076 x C, Pu-239 230 = 17.480 : 4.558 n Ci Pu-239	230	C <sub>f</sub> Pu- 239	: :	0,076	24!	c/s CAN. 12-
	Am - 241	EVALUACION DE Pu- 239 NO EXISTIENDO AM- 241	9 NO	Pu- 25	30	EVALUACION

c+5 CAN 12-24 0.076 x C+ Pu- 238 105 = 7.980	c/s CAN. 12-24 FRACCION Am - 241 c/s NETAS DE Pu - 238
238 105 =	Am - 241
71980 . 21081 nci Pu- 238	c/s NETAS DE Pu- 238

EVALUACION DE Pu- 238

# CONTADOR DE RADIACTIVIDAD

CT C/S	1528 01764		CAN 12 24 394 CT 01197 6/6 C/S CAN	ESPESOR TORACICO:	CORPORAL
c/s can 50-70 01814 - 01751 c/s FONDO CORPORAL = 01063 c/s NETAS	c/s can. 12-24 01197 - 01125 c/s FONDO CORPORAL = 01072 c/s NETAS	c/s CAN. 75-100 0.764 x C. 983 = 0.751 FONDO CORPORAL EN c/s CAN. 50-70	c/s CAN 75-100 01764 x 01163 = 01125 FONDO CORPORAL EN C/S CAN 12-24	PROCEDENCIA PALOMARES (ALMERIA) FECHA: 20 FEBREE	APELLIDOS: NOMBRE:

c/s
CAN
<b>5</b> 0 - 70
0
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-m
0,1
96
11
c/s CAN 50-70 0°C63 x E 0°196 = 0°012 = FRACCION Am - 241 EN CAN 12-24
FR
ACCION
Am -
241
m Z
CAX
. 12
-24

c/s CAN 12-24 01060 x Ct Pu-239 420 = 251200 : 111161 h Ci DE Pu-239	x C <sub>1</sub> Pu-239 420	c/s CAN, 12-24 01060
- FRACCION Am - 241 = 01060c/s NETAS DE Pu - 239	FRACCION Am - 241	C/5 CAN. 12-24 01072 -
	EXISTIENDO Am- 241	EVALUACION DE Pu- 239 EXISTIENDO Am- 241

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ACIO	٠
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DE	
Pu-	
239	
Z O	
EVALUACION DE Pu- 239 NO EXISTIENDO Am - 241	,
00	
A H	
241	

# CONTADOR DE RADIACTIVIDAD

## CORPORAL

c/s CAN 50-70 C+373 _ C+387 c/s FONDO CORPORAL = C/s NETAS	
c/s FONDO CORPORAL =	CAN 75-100 787 C.T. 01394 c/s
01443 C1064	CAN 50 - 70 745 C.T. 01373 ds
01394 x 01163 =	CAN 12 - 24 226 C.T. 01113 c/s
SEATION	ESPESOR TORACICO 1133 Cm
NOMBRE	

		.24	12-	CAN	m Z	241	CION DE AM - 241 EN CAN 12-24	30	EVALUACION DE LA FRACCION DE AM- 241 EN CAN 12-24	LA	ag.	S Z	FVALUACION DE LA	
														Ī
Ü	1.	H					C+ Am- 241	¢ .	r/s CAN 50-70x		: ::!	50 - 7	S CAN	1.

DE Am - 241

EVALUACION

Am - 241

c/s CAN. 50-70 ..... \_m = FRACCION 4m - 241 EN CAN 12-24

EVALUACION c/s CAN 12-24 x Ct Pu-239 = c/s CAN 12-24 - FRACCION Am - 241 DE Pu- 239 EXISTIENDO Am- 241 = .....c/s NETAS n Ci DE

EVALUACION DE PU- 239 NO EXISTIENDO AM - 241

CIS CAN 12-24 01049 x C, PU- 239 250 = 131720 .

EVALUACION DE Pu- 238

CIS CAN. 12-24 01049 c/s CAN. 12-24 - FRACCION Am- 241 = ' x C<sub>1</sub> Pu- 238 ......128 .....= cls NETAS DE Pu- 238 61272 .1.954 .... nci Pu- 238

c/s NETAS DE PI

41274 n Ci Pu- 239

Pu- 239

DE Pu-239